

HCV NS4B Wild type DNA Sequence (783 nucleotides):

GCCTCACACCTCCCTTACATCGAACAGGGAATGCAGCTCGCCGAACAATTCAAACAGAAGGC
AATCGGGTTGCTGCAAACAGCCACCAAGCAAGCGGAGGCTGCTGCTCCCGTGGTGGAATCCA
AGTGGCGGACCCTCGAAGCCTTCTGGGCGAAGCATATGTGGAATTTTCATCAGCGGGATACAAT
ATTTAGCAGGCTTGTCCACTCTGCCTGGCAACCCCGCGATAGCATCACTGATGGCATTACAG
CCTCTATCACCAGCCCGCTCACCACCCAACATAACCCTCCTGTTTAACATCCTGGGGGGATGGG
TGGCCGCCCAACTTGCTCCTCCCAGCGCTGCTTCTGCTTTCGTAGGCGCCGGCATCGCTGGAGC
GGCTGTTGGCAGCATAGGCCTTGGGAAGGTGCTTGTGGATATTTTGGCAGGTTATGGAGCAGG
GGTGGCAGGCGCGCTCGTGGCCTTTAAGGTTCATGAGCGGCGAGATGCCCTCCACCGAGGACC
TGGTTAACCTACTCCCTGCTATCCTCTCCCCTGGCGCCCTAGTCGTCGGGGTTCGTGTGCGCAGC
GATACTGCGTCGGCACGTGGGCCCAGGGGAGGGGGCTGTGCAGTGGATGAACCGGCTGATAG
CGTTCGCTTCGCGGGGTAACCACGTCTCCCCACGCACTATGTGCCTGAGAGCGACGCTGCAG
CACGTGTCACTCAGATCCTCTCTAGTCTTACCATCACTCAGCTGCTGAAGAGGCTTCACCAGTG
GATCAACGAGGACTGCTCCACGCCATGC

HCV NS4B Wild type Protein Sequence (261 amino acids):

ASHLPYIEQGMQLAEQFKQKAIGLLQTATKQAEAAAPVVESKWRTLBAFWAKHMWNFISGIQYL
AGLSTLPGNPAIASLMAFTASITSPLTTQHTLLFNILGGWVAAQLAPPSAASAFVGAGIAGAAVGS
GLGKVLVDILAGYGAGVAGALVAFKVMSEMPSTEDLVNLLPAILSPGALVVGVVCAAILRRHV
GPGEAVQWMNRLIAFASRGNHVSPTHYVPESDAAARVTQILSSLTITQLKRLHQWINEDCSTPC

FIGURE 1

HCV NS4B 232559 variant DNA Sequence (783 nucleotides):

GCCTCACACCTCCCTTACATCGAACAGGGAATGCAGCTCGCCGAACAATTCAAACAGAAGGC
AATCGGGTTGCTGCAAACAGCCACCAAGCAAGCGGAGGCTGCTGCTCCCGTGGTGGGAATCCA
AGTGGCGGACCCTCGAAGCCTTCTGGGCGAGGCATATGTGGAATTTTCATCAGCGGGATACAAT
ATTTAGCAGGCTTGCTCACTCTGCCTGGCAACCCCGCGATAGCATCACTGATGGCATTACAG
CCTCTATCACCAGCCCGCTCACCACCCAACATACCCTCCTGTTTAACATCCTGGGGGGATGGG
TGGCCGCCCAACTTGCTCCTCCCAGCGCTGCTTCTGCTTTTCGTAGTCGCCGGCATCGCTGGAGC
GGCTGTTGGCAGCATAGGCCTTGGAAGGTGCTTGTGGATATTTTGGCAGGTTATGGAGCAGG
GGTGGCAGGCGCGCTCGTGGCCTTTAAGGTCATGAGCGGCGAGATGCCCTCCACCGAGGACC
TGGTCAACCTACTCCCTGCTATCTCTCTCCCTGGCGCCCTAGTCGTCGGGGTCGTGTGCGCAGC
GATACTGCGTCGGCACGTGGGCCAGGGGAGGGGGCTGTGCAKTGGATGAACCGGCTGATAT
CGTTCGCTTCGCGGGGTAACCACGTCTCCCCACGCACTATGTGCCTGAGAGCGACGCTGCAG
CACGTGTCACTCAGATCCTCTCTAGTCTTACCATCACTCAGCTGCTGAAGAGGCTTCACCAGTG
GATCAACGAGGACTGCTCCACGCCATGC

HCV NS4B 232559 variant Protein Sequence (261 amino acids):

ASHLPYIEQGMQLAEQFKQKAIGLLQTATKQAEAAAPVVESKWRTLEAFWARHWMWNFISGIQYL
AGLSTLPGNPAIASLMAFTASITSPLTTQHTLLFNILGGWVAAQLAPPSAASAFVVAGIAGAAVGS
ILGKVLVDILAGYGAGVAGALVAFKVMSEMPSTEDLVNLLPAILSPGALVVGVVCAAILRRHV
GPGEAVXWMNRLISFASRGNHVSPTHYPESDAAARVTQILSSLTITQLLKRLHQWINEDCSTPC

Figure 2

Figure 3A

Flaviviridae species, their serotypes, strains and isolates

1. Tick-borne viruses

Mammalian tick-borne virus
group

| | | |
|--------------------------------------|-------------------|--------|
| <i>Gadgets Gully virus</i> | <u>[AF013374]</u> | (GGYV) |
| <i>Kadam virus</i> | <u>[AF013380]</u> | (KADV) |
| <i>Kyasanur Forest disease virus</i> | <u>[X74111]</u> | (KFDV) |
| <i>Langat virus</i> | | (LGTV) |
| strain TP21 | <u>[M73835]</u> | |
| strain TP21 | <u>[M86650]</u> | |
| <i>Omsk hemorrhagic fever virus</i> | <u>[X66694]</u> | (OHFV) |
| <i>Powassan virus</i> | <u>[L06436]</u> | (POWV) |
| <i>Royal Farm virus</i> | <u>[AF013398]</u> | (RFV) |
| Karshi virus | <u>[AF013381]</u> | (KSIV) |
| <i>Tick-borne encephalitis virus</i> | | (TBEV) |
| European subtype | | |
| Neudoerfl virus | <u>[M27157]</u> | (NEUV) |
| Neudoerfl virus | <u>[M33668]</u> | (NEUV) |
| Far Eastern subtype | <u>[X07755]</u> | |
| Sofjin virus | <u>[X07755]</u> | (SOFV) |
| Siberian subtype | | |
| Vasilchenko | <u>[L40361]</u> | |
| <i>Louping ill virus</i> | | (LIV) |
| LIV strain 369/T2 | <u>[M59376]</u> | |
| LIV strain SB 526 | <u>[M94957]</u> | |
| LIV strain SB 526 | <u>[X59815]</u> | |
| Negishi virus | <u>[M94956]</u> | (NEGV) |
| Irish subtype | <u>[X86784]</u> | |
| British subtype | <u>[D12937]</u> | |
| Spanish subtype | <u>[X77470]</u> | |
| Turkish subtype | <u>[X69125]</u> | |

Figure 38

| | | |
|--|-------------------|----------|
| Seabird tick-borne virus group | | |
| <i>Meaban virus</i> | | (MEAV) |
| Brest ART707 | <u>[AF013386]</u> | |
| <i>Saumarez Reef virus</i> | | (SREV) |
| CSIRO-4 | <u>[X80589]</u> | |
| <i>Tyuleniy virus</i> | | (TYUV) |
| Three Arch Rock | <u>[X80588]</u> | |
| 2. Mosquito-borne viruses | | |
| Aroa virus group | | |
| <i>Aroa virus</i> | | (AROAV) |
| VenA-1809 | <u>[AF013362]</u> | |
| Bussuquara virus | | (BSQV) |
| BeAn 4073 | <u>[AF013366]</u> | |
| Iguape virus | | (IGUV) |
| SP An71686. | <u>[AF013375]</u> | |
| Naranjal virus | | (NJLV) |
| 25008 | <u>[AF013390]</u> | |
| Dengue virus group | | |
| <i>Dengue virus</i> | | (DENV) |
| Dengue virus 1 | <u>[M23027]</u> | (DENV-1) |
| Dengue virus 2 | <u>[M19197]</u> | (DENV-2) |
| Dengue virus 3 | <u>[A34774]</u> | (DENV-3) |
| Dengue virus 4 | <u>[M14931]</u> | (DENV-4) |
| <i>Kedougou virus</i> | | (KEDV) |
| Dak Aar D1470 | <u>[AF013382]</u> | |
| Japanese encephalitis virus group | | |
| <i>Cacipacore virus</i> | | (CPCV) |
| BeAn 327600 | <u>[AF013367]</u> | |
| <i>Koutango virus</i> | | (KOUV) |
| Dak Ar D1470 | <u>[AF013384]</u> | |

Figure 3C

| | | |
|--|-------------------|---------|
| Japanese encephalitis virus | | (JEV) |
| strain JaOArS982 | <u>[M18370]</u> | |
| Murray Valley encephalitis virus | <u>[X03467]</u> | (MVEV) |
| Alfuy virus | <u>[AF013360]</u> | (ALFV) |
| St. Louis encephalitis virus | <u>[M16614]</u> | (SLEV) |
| Usutu virus | | (USUV) |
| SAAR-1776 | <u>[AF013412]</u> | |
| West Nile virus | | (WNV) |
| 33/G8; 34/F6 | <u>[M12294]</u> | |
| Kunjin virus | <u>[D00246]</u> | (KUNV) |
| Yaounde virus | | (YAOV) |
| DakArY 276 | <u>[AF013413]</u> | (YAOV) |
| Kokobera virus group | | |
| Kokobera virus | | (KOKV) |
| AusMRM 281 | <u>[AF013383]</u> | (KOKV) |
| Stratford virus | <u>[AF013407]</u> | (STRV) |
| Ntaya virus group | | |
| Bagaza virus | | (BAGV) |
| DakAr B209 | <u>[AF013363]</u> | (BAGV) |
| Ilheus virus | <u>[AF013376]</u> | (ILHV) |
| Rocio virus | <u>[AF013397]</u> | (ROCV) |
| Israel turkey meningoencephalomyelitis virus | <u>[AF013377]</u> | (ITV) |
| Ntaya virus | <u>[AF013392]</u> | (NTAV) |
| Tembusu virus | <u>[AF013408]</u> | (TMUV) |
| Spondweni virus group | | |
| Zika virus | | (ZIKV) |
| MR-766 | <u>[AF013415]</u> | (ZIKAV) |
| Spondweni virus | <u>[AF013406]</u> | (SPOV) |
| Yellow fever virus group | | |
| Banji virus | | (BANV) |

Figure 3D

| | | |
|--|-------------------|---------|
| SAH 336 | <u>[L40951]</u> | |
| <i>Bouboui virus</i> | | (BOUV) |
| DakAr B490 | <u>[AF013364]</u> | |
| <i>Edge Hill virus</i> | | (EHV) |
| Aus C-281 | <u>[AF013372]</u> | |
| <i>Jugra virus</i> | | (JUGV) |
| P9-314 | <u>[AF013378]</u> | |
| Dak An D4600 | <u>[AF013400]</u> | |
| <i>Saboya virus</i> | | (SABV) |
| Potiskum virus | | (POTV) |
| IBAN 10069 | <u>[AF013395]</u> | |
| <i>Sepik virus</i> | | (SEPV) |
| MK7148 | <u>[AF013404]</u> | |
| <i>Uganda S virus</i> | | (UGSV) |
| <i>Wesselsbron virus</i> | | (WESSV) |
| <i>Yellow fever virus</i> | | (YFV) |
| 17D (vaccine strain) | <u>[X03700]</u> | |
| Pasteur 17D-204 (vaccine strain) | <u>[X15062]</u> | |
| strain 1899/81 | | |
| 3. Viruses with no known arthropod vector | | |
| Entebbe virus group | | |
| <i>Entebbe bat virus</i> | | (ENTV) |
| UgIL-30 | <u>[AF013373]</u> | |
| Sokoluk virus | | (SOKV) |
| LEIV-400K | <u>[AF013405]</u> | |
| <i>Yokose virus</i> | | (YOKV) |
| Oita 36 | <u>[AF013414]</u> | |
| Modoc virus group | | |
| <i>Apoi virus</i> | <u>[AF013361]</u> | (APOIV) |
| <i>Cowbone Ridge virus</i> | | (CRV) |

Figure 3E

| | | |
|---|-------------------|--------|
| W-10986 | <u>[AF013370]</u> | |
| <i>Jutiapa virus</i> | | (JUTV) |
| JG-128 | <u>[AF013379]</u> | |
| <i>Modoc virus</i> | | (MODV) |
| M544 | <u>[AF013387]</u> | |
| <i>Sal Vieja virus</i> | | (SVV) |
| 38TWM-106 | <u>[AF013401]</u> | |
| <i>San Perlita virus</i> | | (SPV) |
| 71V-1251 | <u>[AF013402]</u> | |
| <i>Rio Bravo virus group</i> | | |
| <i>Bukalasa bat virus</i> | | (BBV) |
| UGBP-111 | <u>[AF013365]</u> | |
| <i>Carey Island virus</i> | | (CIV) |
| P70-1215 | <u>[AF013368]</u> | |
| <i>Dakar bat virus</i> | | (DBV) |
| 209 | <u>[AF013371]</u> | |
| <i>Montana myotis leukoencephalitis virus</i> | | (MMLV) |
| 40649 | <u>[AF013388]</u> | |
| <i>Phnom Penh bat virus</i> | | (PPBV) |
| CAMA-38D | <u>[AF013394]</u> | |
| <i>Batu Cave virus</i> | | (BCV) |
| P70-1459 | <u>[AF013369]</u> | |
| <i>Rio Bravo virus</i> | | (RBV) |
| M-64 | <u>[AF013396]</u> | |

Tentative Species in the Genus

| | | |
|--------------------------------|-----------------|--------|
| <i>Tamana bat virus</i> | | (TABV) |
| <i>Cell fusing agent virus</i> | <u>[M91671]</u> | (CFAV) |

Figure 3F

| | |
|--------------|-------------------|
| Genus | <i>Pestivirus</i> |
|--------------|-------------------|

| | | |
|--|--------------------------------------|----------|
| Type Species | Bovine viral diarrhea virus 1 (BVDV) | |
| Species, their serotypes, strains and isolates | | |
| Border disease virus (sheep) | | (BDV) |
| BD31 | <u>[U70263]</u> | |
| X818 | <u>[AF037405]</u> | |
| Bovine viral diarrhea virus 1 | | (BVDV-1) |
| NADL | <u>[M31182]</u> | |
| Osloss | <u>[M96687]</u> | |
| SD-1 | <u>[M96751]</u> | |
| CP7 | <u>[U63479]</u> | |
| Bovine viral diarrhea virus 2 | | (BVDV-2) |
| strain 890 | <u>[U18059]</u> | |
| C413 | <u>[AF002227]</u> | |
| Classical swine fever virus | | (CSFV) |
| Alfort/187 | <u>[X87939]</u> | |
| Alfort-Tübingen | <u>[J04358]</u> | |
| Brescia | <u>[M31768]</u> | |
| C strain | <u>[Z46258]</u> | |
| (Hog cholera virus) | | (HCV) |

Tentative Species in the Genus

| | | |
|---|--|--|
| <i>Pestivirus of giraffe (H138 (Giraffe-1))</i> | | |
|---|--|--|

| | |
|--------------|--------------------|
| Genus | <i>Hepacivirus</i> |
|--------------|--------------------|

| | | |
|--|-------------------|-------|
| Type Species | Hepatitis C virus | (HCV) |
| Species, their serotypes, strains and isolates | | |
| Hepatitis C virus | | (HCV) |
| HCV genotype 1 | | |

Figure 36

| | | |
|----------------|-----------------|---------------|
| subtype 1a | <u>[M62321]</u> | (HCV-1) |
| subtype 1b | <u>[D90208]</u> | (HCV-J) |
| HCV genotype 2 | | |
| subtype 2a | <u>[D00944]</u> | (HCV-J6) |
| subtype 2b | <u>[D01221]</u> | (HCV-J8) |
| HCV genotype 3 | | |
| subtype 3a | <u>[D17763]</u> | (HCV-NZL1) |
| subtype 10a | <u>[D63821]</u> | (HCV-JK049) |
| HCV genotype 4 | | |
| subtype 4a | <u>[Y11604]</u> | (HCV-ED43) |
| HCV genotype 5 | | |
| subtype 5a | <u>[Y13184]</u> | (HCV-EVH1480) |
| HCV genotype 6 | | |
| subtype 6a | <u>[Y12083]</u> | (HCV-EUHK2) |
| subtype 11a | <u>[D63822]</u> | (HCV-JK046) |

Unassigned Viruses in the Family

| | | |
|-------------------------------|-------------------|---------------------|
| <i>GB virus A</i> | <u>[U22303]</u> | (GBV-A) |
| <i>GBV-A-like agents</i> | <u>[U94421]</u> | (GBV-A-like agents) |
| <i>GB virus B</i> | <u>[U22304]</u> | (GBV-B) |
| <i>GB virus C</i> | <u>[U36380]</u> | (GBV-C) |
| <i>Hepatitis G virus</i> | <u>[U44402]</u> | (HGV-1) |
| <i>GB virus C troglodytes</i> | <u>[AF070476]</u> | (GBV-C) |
| <i>HGV-Iowan</i> | <u>[AF121950]</u> | (HGV-Iowan) |